REMARKS

This is in response to the *Final* Office Action of February 19, 2009, where the Examiner has rejected claims 1, 3-12, 14-22, 24-28 and 30-47. By the present amendment, applicant has amended claims 1, 12, 22, 28, 34, 37, 40 and 43, and added new claims 48-49. After the present amendment, claims 1, 3-12, 14-22, 24-28 and 30-49 remain pending in the present application. Reconsideration and allowance of outstanding claims 1, 3-12, 14-22, 24-28 and 30-49 in view of the following remarks are requested.

A. Rejection of Claims 1, 3-10, 12, 14-20, 22, 24-26, 28, 30-32 and 34-47 under 35 USC §102(b)

The Examiner has rejected claims 1, 3-10, 12, 14-20, 22, 24-26, 28, 30-32 and 34-47, under 35 USC §102(b), as being anticipated by Kroon (USPN 5,664,055) ("Kroon").

By the present amendment, applicant has amended independent claim 1 to recite in part:

> classifying each of said plurality CELP speech frames into a plurality of classes, wherein each of said plurality of classes of said input speech signal represents a different degree of periodicity of said input speech signal, and wherein said plurality of classes of said input speech signal include a background noise class, an unvoiced class, a first voiced class, a second voiced class, wherein said first voiced class has a lower degree of periodicity than said second voiced class;
>
> creating a plurality of voicing indexes by said encoder, wherein each of said plurality of voicing indexes **specifically designates** one of said plurality of classes of said input speech signal; and
>
> transmitting each of said plurality of voicing indexes as part of each of said plurality of CELP speech frames and in addition to said CELP coding parameters, by said encoder to said decoder for **specifically designating** one of a plurality of classes corresponding to each of said plurality of CELP speech frames, whereby enhancing said synthesis of said input speech signal by said decoder.

In response to applicant's prior remarks for distinguishing the invention of claim 1 over Kroon, the Examiner states that:

> The examiner points out to applicant that the voicing index is just indicative data of one f a plurality of classes of the input speech signal. There is no classification step in claim 1. Claim 1 simply generates indicative information about the plurality of classes of the input speech signal. For this matter, Kroon's decoder performs calculations for classifying the speech signal (cols. 29-30), which is based on parameters and indexes transmitted by the encoder .... The step of transmitting a voicing indexes indicative of one of a plurality of classes of the input speech signal, as recited in claim 1, doe not mean that the classification is done at the encoder side, as intended by applicant arguments.

In view of the Examiner's above statements, applicant has amended claim 1 based on the disclosure in the present application to include a classification step in claim 1, where the encoder classifies the speech signal into a plurality of classes of including a background noise class, an unvoiced class, a first voiced class, a second voiced class, where the first voiced class has a lower degree of periodicity than the second voiced class. In addition, claim 1 has been amended to state that each of the plurality of voicing indexes **specifically designates** one of the plurality of classes of the input speech signal, rather than being indicative of one of the plurality of classes of the input speech signal. For example, the present application provides:

> The voicing index, which is transmitted by the encoder to the decoder, may represent the periodicity of the voiced speech or the harmonic structure of the signal. In another example embodiment, the voicing index may be represented by three bits thus providing up to eight classes of speech signal. For instance, Figure 2 is an illustration of a voicing index classification available to both the encoder and the decoder. In this illustration, index 0 (i.e. "000") may indicate background noise, index 1 (i.e. "001") may indicate noise-like or unvoiced speech signal, index 2 (i.e. "010") may indicate irregular voiced signal such as voiced signal during onset, and indices 3-7 (i.e. "011" to "111") could each indicate the periodicity of the speech signals. For instance, index 3 ("011") may represent the least periodic signal and index 7 ("111") may indicate the most periodic signal. (Page 7, line 19 – Page 8, line 7.)

Therefore, as explained previously, applicant respectfully submits that the encoder of Kroon *does not transmit* a voicing index **specifically designating** of one of the plurality of classes of the input speech signal. Applicant respectfully submits that a key distinction between claim 1 of the present application and Kroon is that the transmission of the speech classification index eliminates the need for using speech parameters by the decoder to classify the speech signal, and the decoder may simply use the result of encoder classification, as designated by the voicing index. Applicant respectfully submits that there is no single parameter in Kroon that is transmitted by the encoder that can, standing alone, inform the decoder of frame classifications designated by a background noise class, an unvoiced class, a first voiced class, a second voiced class, wherein said first voiced class has a lower degree of periodicity than said second voiced class.

At col. 30, lines 55-65, Kroon discusses the concealment of frame erasures and parity errors, and states that "If the last correctly received frame was classified as periodic, the current frame is considered to be periodic as well." It is respectfully submitted that the disclosure at col. 30, lines 1-18 of Kroon, as quoted below, clearly shows that the classification is performed at the decoder. It is respectfully submitted that if the received frame from the encoder, in Kroon, did include a classification index, there would be no need for the decoder of Kroon to perform classification, as described at col. 30, lines 1-18:

> The concealment strategy has to reconstruct the current frame, based on previously received information. The method used replaces the missing excitation signal with one of similar characteristics, while gradually decaying its energy. This is done by using a voicing classifier based on the long-term prediction gain, which is computed as part of the long-term postfilter analysis. The pitch postfilter (**see Subsection II.4.2.1**) finds the long-term predictor for which the prediction gain is more than 3 dB. This is done by setting a threshold of 0.5 on the normalized correlation R'(k)

> (Eq. (81)). For the error concealment process, these frames will be classified as periodic. Otherwise the frame is declared nonperiodic. An erased frame inherits its class from the preceding (reconstructed) speech frame. Note that the voicing classification is continuously updated based on this reconstructed speech signal. Hence, for many consecutive erased frames the classification might change. Typically, this only happens if the original classification was periodic. (emphasis added.)

Applicant respectfully notes that Section 4 of Kroon describes "Functional Description of the Decoder," and Section 4.2.1 describes "Pitch Posfilter" for the decoder of Kroon. Therefore, it is respectfully submitted that the decoder of Kroon classifies the speech signal, and the disclosure at col. 30, 55-65, teaches away from the invention of claim 1 *by showing that the decoder classification is not based on a classification index received from the encoder*.

Further, it is respectfully submitted that the error concealment section of Kroon does not use a classification index from the encoder, but the error concealment section of Kroon uses the classification information derived in Subsection II.4.2.1 of the decoder in Kroon. Therefore, Kroon fails to disclose, teach or suggest that its encoder transmits a voicing indexes that *specifically designates* one of a plurality of classes, where the classes of the input speech signal designated by the voicing index include a background noise class, an unvoiced class, a first voiced class, a second voiced class, wherein said first voiced class has a lower degree of periodicity than said second voiced class.

Accordingly, for the reasons stated above, it is respectfully submitted that claim 1, as amended, is patentable over Kroon. In addition, independent claims 12, 22 and 28 include limitations similar to those of claim 1, as amended, and should be allowed for the same reasons stated above. Further, claims 3-10, 14-20, 24-26, 30-32 and 34-47 depend from claims 1, 12, 22 and 28, respectively, and should be allowed at least for the reasons stated above.

B. Rejection of Claims 11, 21, 27 and 33 under 35 USC §103(a)

The Examiner has rejected claims 11, 21, 27 and 33, under 35 USC §103(a), as being unpatentable over Kroon in view of Morii, et al. (PGPUB 2006/0206317) ("Morii").

Applicant respectfully submits that claims 11, 21, 27 and 33 depend from claims 1, 12, 22 and 28, respectively, and should be allowed at least for the reasons stated above.

C. New Claims 48-49

By the present amendment, applicant has added claims 48 and 49, which depend from claims 1 and 12, respectively, and recite "wherein each of said plurality of voicing indexes is derived from a normalized pitch correlation parameter Rp, where $-1.0 < Rp < 1.0$." Applicant respectfully submits that claims 48 and 49depend from claims 1 and 12, respectively, and should be allowed at least for the reasons stated above.

D. Conclusion

Based on the foregoing reasons, an early Notice of Allowance directed to all claims 1, 3-12, 14-22, 24-28 and 30-49 pending in the present application is respectfully requested.

Respectfully Submitted,
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